

Assessing Effectiveness of Outrigger and Belt Truss System for Tall Buildings under Wind Loadings

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Abstract : This paper is to investigate a 54-story reinforced concrete residential tall building structures—238.8 meters high. Shear walls, core walls, and columns are the primary vertical components. Other special lateral components—core-outrigger and belt trusses—are studied and combined with the structural system in order to increase the structural stability during severe lateral load events, particularly, wind loads. The wind tunnel tests are conducted using the force balance technique. The overall wind loads and dynamics response of the building are also measured for 360 degrees of azimuth—basis for 10-degree intervals. The results from numerical analysis indicate that an outrigger and belt truss system clearly engages perimeter columns to efficiently reduce acceleration index and lateral deformations at the top level so that the building structures achieve lateral stability, and meet standard provision values.

Keywords : outrigger, belt truss, tall buildings, wind loadings

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